2004 Blackstone River Watershed Five-Year Action Plan

September 2004

Prepared For:

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November 20, 2004

Dear Friends of the Blackstone River Watershed:

It is with great pleasure that I present you with the 5-Year Watershed Action Plan for the Blackstone River Watershed. The plan will be used to guide local and state environmental efforts within the Blackstone River Watershed over the next five years. The plan expresses some of the overall goals of the Executive Office of Environmental Affairs, such as improving water quality, restoring natural flows to rivers, protecting and restoring biodiversity and habitats, improving public access and balanced resource use, improving local capacity, and promoting a shared responsibility for watershed protection and management.

The Blackstone River Watershed Action Plan was developed with input from the Blackstone River Watershed Team and multiple stakeholders including watershed groups, state and federal agencies, Regional Planning Agencies and, of course, the general public from across the Watershed. We appreciate the opportunity to engage such a wide group of expertise and experience as it allows the state to focus on the issues and challenges that might otherwise not be easily characterized. From your input we have identified the following key priorities:

- Water Quality Improvement & Protection
- Water Quantity/Streamflow Protection & Management
- Habitat Improvement & Protection

I commend everyone involved in this endeavor. Thank you for your dedication and expertise. If you are not currently a participant, I strongly encourage you to become active in the Blackstone River Watershed restoration and protection efforts.

Regards,

Ellen Roy Herzfelder

Ellen Roy Herzfelder

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APPENDICES

SECTION 1: INTRODUCTION

1.1 PROJECT PURPOSE

GeoSyntec Consultants was contracted by the Massachusetts Executive Office of Environmental Affairs (EOEA) to work with local communities to develop a Five-Year Watershed Action Plan for the Blackstone River Watershed (*Figure 1*).

Thirty-eight communities in Massachusetts and Rhode Island are located either entirely or partially within the Blackstone River Watershed. This project provided a unique opportunity for watershed communities to cooperatively prioritize goals and set a course for the future of the watershed. The recommendations of this locally developed Five Year Action Plan will receive prioritization for funding from state grant programs and other funding sources.

As described below in Section 1.2, GeoSyntec served as technical consultant and facilitator for a watershed planning process that was structured around local participation and input from a Watershed Advisory Committee (WAC) and other public participants. The three primary goals of this watershed planning project are described below.

FIVE-YEAR WATERSHED ACTION PLAN GOALS:

- **Promote Watershed-wide Planning, Cooperation and Consistency:** By emphasizing local involvement and inter-municipal collaboration in development of the Five-Year Action Plan, a strong focus of this project was to foster consistency and a regional perspective in the planning goals of the watershed communities.

- **Synthesize and Prioritize Existing Information From a Variety of Sources:** The Five Year Action Plan reflects the review, synthesis, and prioritization of a variety of previous assessments of the Blackstone River watershed, including the *Draft 2000 Blackstone River Watershed Action Plan* developed by EOEA.

- **Develop a Five Year Action Plan That is Relevant, Focused and Achievable:** The recommendations of this Action Plan are intended to be (1) *relevant* to the communities of the Blackstone River Watershed, (2) *focused* on the issues of greatest concern and/or greatest potential benefit to the Watershed, and (3) *achievable* within a five-year timeframe given existing and realistically anticipated resources.

1.2 THE WATERSHED ACTION PLANNING PROCESS

In cooperation with EOEA staff, GeoSyntec conducted outreach to municipalities and other stakeholders in the Blackstone River Watershed, inviting representatives from the watershed to participate on a Watershed Advisory Committee (WAC). Lynne Welsh of the Massachusetts Department of Environmental Protection (former EOEA Watershed Team Leader for the Blackstone River Watershed) played an important role in identifying potential local representatives for participation in the WAC.

To begin the process of forming the WAC, a letter was sent to municipal leaders, local environmental organizations and other key watershed stakeholders, which described the project and solicited participation in this watershed planning process. To ensure representation from all watershed communities, each town was requested to appoint at least two members to the WAC. Participation by additional representatives was encouraged. Committee participation was also directly requested of other key watershed stakeholder organizations, including the Blackstone Watershed Association, the Blackstone River Coalition, the Blackstone Headwaters Coalition, Massachusetts Audubon Society, the Central Massachusetts Regional Planning Commission, and representatives from Rhode Island-based groups including the Rhode Island Department of Environmental Management, the Blackstone River Watershed Council and others.

A project website (http://projects.geosyntec.com/bw0027/) was established by GeoSyntec to provide a convenient means of posting draft project reports, WAC contact information and other documents related to the project.

After the community representatives to the WAC were appointed, a kickoff meeting and a series of four public planning forums were held at the Massachusetts DEP Central Region Office in Worcester between February and August of 2004. GeoSyntec facilitated these meetings, during which the Watershed Advisory Committee and other public participants developed the priorities and watershed action items described in Section 3 of this Five-Year Watershed Action Plan. A contact list of Watershed Advisory Committee members and other key watershed planning contacts is provided as Appendix 4 to this report.

Blackstone River Watershed 5-Year Action Plan Public Forums

January 23, 2004 (kickoff meeting)
February 13, 2004
March 5, 2004
April 2, 2004
August 12, 2004

SECTION 2: OVERVIEW OF BLACKSTONE RIVER INFORMATION

2.1 WATERSHED BACKGROUND INFORMATION

A variety of previous studies, planning documents and other information sources related to the Blackstone River Watershed were reviewed by GeoSyntec in developing this Watershed Action Plan. These information sources are listed in a table on page 12. A brief overview of the Blackstone River Watershed and related planning issues is provided below, as excerpted from several of these information sources.

Stone arch bridge over the Blackstone River.

2.1.1 The Blackstone River Coalition

The Blackstone River Coalition (BRC) is comprised of a variety of organizations that are concerned with the restoration of the Blackstone River and the health of the Blackstone River Watershed. These organizations include state and federal agencies, non-profit organizations, municipalities, and businesses, many of which participated actively in development of this Action Plan.

On a parallel track with this project were the BRC's efforts to develop a strategic action plan for the **2015 Campaign for a Fishable /Swimmable Blackstone River.** The Campaign action plan incorporates this watershed action plan, and much of both plans will be accomplished by the Campaign Coalition. More information on the 2015 Campaign can be found at: http://www.nps.gov/blac/discover/improving.htm

The **Narragansett Bay and Watershed Commission**, whose goal is to reduce nutrient loading to the Bay by 50%, has committed support to the 2015 Fishable/Swimmable Campaign. The Blackstone contributes 20% of dry weather nutrient loading to the Bay and up to 50% in wet weather. More information on the Commission can be found at: http://www.ci.uri.edu/GovComm/Default.htm

The BRC has also recently been involved in a series of **River Visioning Charettes**, with a goal of combining skilled professional planners and broad public input to create a vibrant future vision for the Blackstone River corridor. More information on the river visioning charettes will soon be posted at: http://www.nps.gov/blac/zap/home/home.html

The Blackstone River Coalition

- **Blackstone Headwater Coalition**
- **Blackstone Headwater Hydrology Project**
- **Blackstone River Watershed Association**
- **Blackstone River Watershed Council**
- **City of Woonsocket-Thundermist Hydro**
- **Indian Lake Watershed Association**
- **Leesville Pond Watershed Association**
- **MA Dept. of Environmental Protection**
- **MA Riverways Programs**
- **Metacomet Land Trust**
- **Narragansett Bay Estuary Program**
- **Pawtucket Hydropower**
- **RI Dept. of Environmental Management**
- **Tatnuck Brook Watershed Organization**
- **Wild Bird Gardens**
- **Woods Rat**
- **MassAudubon-Broad Meadow Brook**
- **John H. Chafee Blackstone River Valley National Heritage Corridor**

More information on the Blackstone River Coalition and the member organizations listed above can be found at: **http://www.nps.gov/blac/zap/home/home.html**

2.1.2 Overview of the Blackstone River Watershed

Adapted from the Blackstone River Watershed Action Plan (July 2001, MA-DEP)

Originating as a series of streams in the hills of Worcester, the Blackstone River flows 48 miles south into Rhode Island, dropping 450 feet before emptying into Narragansett Bay near Providence. The Blackstone River Watershed comprises a total of 640 square miles, with 382 square miles located in south central Massachusetts and 258 square miles in northern Rhode Island. The length of the mainstem Blackstone River is evenly divided between Massachusetts and Rhode Island, with 24 river miles in each state. The major tributaries of the Blackstone River are the Quinsigamond, West, Mumford, Mill, and Peters Rivers. 1,300 acres of lakes, ponds, and reservoirs are also located within the watershed.

Weasel Brook, Worcester

As shown in Figure 1 on the following page, twenty-nine Massachusetts municipalities and ten Rhode Island municipalities are located either entirely or partially within the Blackstone River Watershed. Of these thirty-nine towns, nineteen are located either entirely or predominantly (>50% of land area) within the Blackstone River Watershed.

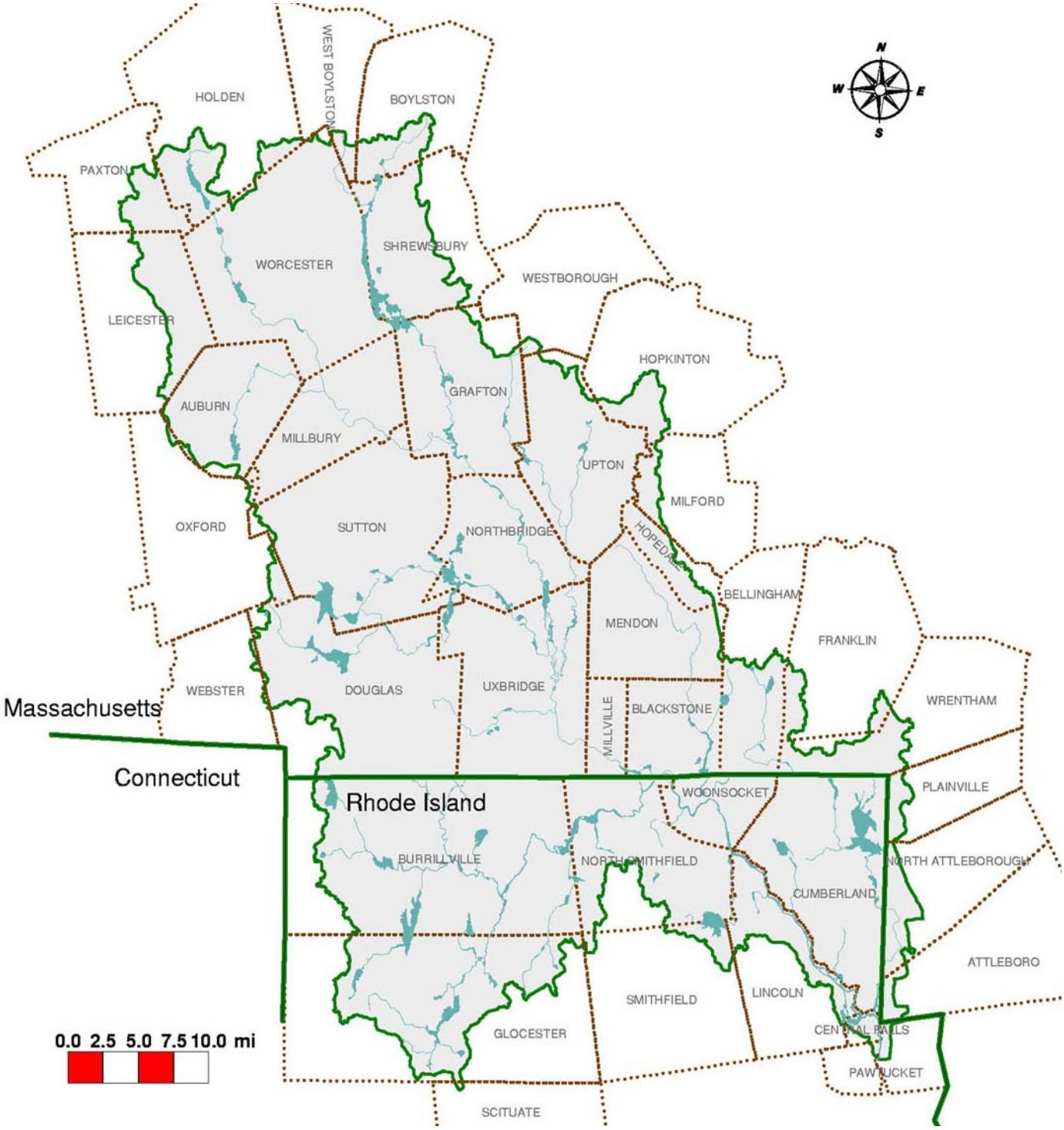
2.1.3 A Brief History of the Blackstone River

Excerpted from the Blackstone River Watershed Action Plan (July 2001, MA-DEP) and www.zaptheblackstone.org

Originally named after the first European resident of the valley, the Reverend William Blaxton, the Blackstone Valley later became known as the "Birthplace of America's Industrial Revolution" when the settlers took advantage of the natural water power of the river in the early 19th Century. The Blackstone River's history of intense industrial development left its waters polluted and its course altered. Industrial activity and accompanying settlement left the river severely polluted with untreated sewage, detergents, solvents, heavy metals and other industrial wastes. The presence of numerous dams, canals and other human interventions means that little remains of its natural, free-flowing state. A 1990 report sponsored by the EPA described the Blackstone River "*the most polluted river in the country with respect to toxic sediments.*" While toxic sediments trapped behind industrial-era dams continue to impact the long-term health of the River, considerable water quality improvements have been achieved as a result of the Clean Water Act and other pollution reduction initiatives.

The Blackstone River became a part of the National Heritage Corridor system in 1986 and was designated as an American Heritage River in 1998.

Figure 1: Blackstone River Watershed Communities



2.1.4 Summary of Major Watershed Information Sources

To provide an overview of current water quality and watershed planning issues facing the Blackstone River Watershed, this section provides excerpts from the major sources of existing information that are listed on page 12. Several of the source documents summarized below include detailed lists of action items that are too lengthy to include in this report. The key watershed issues identified in these documents are listed below.

1998 Blackstone River Basin Water Quality Assessment Report (MA DEP)

- The Blackstone, Middle, Mill, West and Peters Rivers, a portion of the Mumford River, "Mill" and Tatnuck Brooks, and a portion of Kettle Brook as well as 88 lakes are on the 1998 303(d) list of impaired waters.
- 25% of the river miles assessed in the Blackstone Basin support the ***Aquatic Life Use*** while 45% are impaired (partial or non-support). The entire 28.8 mile length of the mainstem Blackstone River in Massachusetts was assessed as non-support for the *Aquatic Life Use*. Habitat alteration, organic enrichment, elevated nutrients, instream and whole effluent toxicity, sediment contamination (heavy metals), and flow alteration were identified as causes of impairment.
- DPH issued **fish consumption advisories** for three impoundments along the mainstem Blackstone River (Riverdale Pond, Rice City Pond, and the Blackstone River Impoundment above the Blackstone Gorge) as well as a reach of the Mill River (the outlet of Hopedale Pond to the Spindleville Pond Dam) because of elevated PCB concentrations in fishes (MA DPH 1999). The *Fish Consumption Use* is therefore assessed as non-support for a total of five miles of the mainstem Blackstone River and a 1.7-mile reach of the Mill River. No other river miles were assessed.
- Information on drinking water source protection and finish water quality is available at http://www.state.ma.us/dep/brp/dws/dwshome.htm and from the Blackstone River Basin's public water suppliers.
- Only a portion of the West River (from Upton WWTP to its confluence with the Blackstone River) was assessed as supporting ***Primary* and *Secondary Contact Recreational*** uses. 33% of the assessed river miles in the Blackstone River Basin were impaired (partial or non-support) for these uses. The entire 28.8 mile length of the mainstem Blackstone River in Massachusetts was assessed as either partial or non-support for the *Primary* and *Secondary Contact Recreational* uses because of elevated fecal coliform bacteria, turbidity, and odor. Sources, when known, included municipal point source and combined sewer overflow discharges, illicit sewer connections, and urban runoff/storm water.
- 27% of the river miles (portions of Kettle Brook, the Mumford, West and Mill rivers, and the entire length of Dark Brook) were assessed as supporting the ***Aesthetics Use***. Forty-three percent of the assessed river miles in the Blackstone River Basin were impaired (partial or non-support) for this use. The entire 28.8 mile length of the mainstem Blackstone River in Massachusetts was assessed as either partial or non-support for the *Aesthetics Use* because of objectionable conditions (trash/debris, turbidity and odor). Sources, when known, included municipal point source and combined sewer overflow discharges, illicit sewer connections, and urban runoff/storm water.
- Lakes in the Blackstone River Basin represent all stages of succession, as described in terms of trophic status estimates (Table 1). Excessive plant growth in lakes (both rooted aquatics and algae) was the most frequently recorded cause of impairment for multiple uses (*Aquatic Life, Primary* and *Secondary Contact Recreation* and *Aesthetics*).

Nonpoint Source (NPS) Action Strategy – Blackstone River Basin (July 5, 2001, MA-DEP)

The NPS Action Strategy consists of 101 summary assessments for stream reaches, lakes and ponds in the Blackstone River Watershed. Each assessment lists the waterbody name and location (stream segment), impairments (including 303d status), recommended NPS actions, and other noteworthy issues.

- Of the 101 assessments, 72 are for lakes and ponds that are included on the 303d Integrated List of Impaired Waters for Noxious Aquatic Plants. Recommended actions for these water bodies generally included the following:

  1. Conduct shoreline and watershed survey to identify NPS sources
  2. Conduct detailed mapping of native and invasive macrophyte species.
  3. Address phosphorus loading through watershed controls.

- The 29 stream reaches assessed in the NPS Action strategy describes a wide variety of impairments and recommended NPS actions which can be reviewed in their entirety at http://www.mass.gov/dep/brp/wm/files/npsmpv.pdf .

Blackstone River Watershed Action Plan (July 2001, MA-DEP)

- **Top Five Watershed Priorities**
  - Improve impaired water quality due to stormwater runoff and other sources of NPS pollution.
  - Examine the effects of low flow on in-stream water quality and the surrounding ecosystems.
  - Monitor fluctuations in water quality and increased degraded sediments along riparian buffers.
  - Work to prevent loss of open space habitat within the watershed, and promote growth management techniques to the local communities.
  - Develop mechanisms to increase land conservation and promote natural resource protection.

Blackstone River Watershed Action Plan (Draft: September 7, 2001, RI-DEM)

- **Key Watershed Issues**
  - Much of the Blackstone River and its tributaries are impaired due to biodiversity impacts, pathogens, hypoxia, nutrients, ammonia (un-ionized), and metals (Cu, Pb)
  - Water use and availability has not been characterized in the watershed.
  - Poor air and water quality poses a health risk in some communities of the watershed.
  - The actual risk of fish consumption is not known in the watershed.
  - Environmental Equity is a problem in the watershed's urban communities.
  - The Blackstone Watershed faces increased development in suburban/rural communities and redevelopment in more urban areas. This development pressure results in the continued loss of important natural, cultural and recreational places.
  - Some watershed communities lack the tools and resources needed to plan for growth.
  - Due in part to the rich industrial heritage of the watershed, several contaminated sites are present within the watershed which remain a risk to human and ecological health as well as being a barrier to economic development.

- The communities in the Blackstone River Watershed have a proud history of mills and other river-based industry, and hold an important place in history as the "Birthplace of the American Industrial Revolution." The Watershed has gone from a time when the river was the focus of economic strength to a time when the river has been all but forgotten in some communities.
- Many dams in the watershed need inspections and/or repairs to improve safety and function.
- Excessive damming has had negative impacts on anadramous fish runs and stream flow.
- Flooding is a problem in certain areas of the watershed.
- The Blackstone River Watershed Council is a young but strong community-based organization working to revitalize the environment, historical and economic resources of the watershed. Currently they are relying on competitive grants to fund personnel, administrative and outreach cost. This takes a great deal of time and efforts away from their mission and outreach efforts.
- The Blackstone Watershed includes communities in RI and MA. In order to be most effective, watershed groups must actively coordinate and communicate efforts across state boundaries.
- Current transportation projects are not well coordinated with environmental restoration efforts.
- Public transportation does not adequately address resident's needs.
- Traffic Congestion has a negative impact on air quality and economic development in the area.

2020 Growth Strategy for Central Massachusetts (February 2000, CMRPC)

- **Summary of Issues for Worcester and the Blackstone Valley**
  - Worcester's once dominant economic position in the region is expected to diminish further as nearby suburban towns continue to expand.
  - Since Worcester is near full build-out, the City's extensive brownfield sites offer the best opportunity for economic growth. The City will need to address its relatively property tax rate for commercial/industrial development to attract new development.
  - Worcester's major challenge for the near future is the revitalization of its downtown center.
  - Only 16.7% of the Blackstone Valley is developed today (1999), but this region is believed to be the next target area for significant growth. A Smart Growth strategy should be used to promote compact growth with a village center emphasis.
  - Of the six Central Massachusetts subregions, the Blackstone Valley has the most abundant water system capacity. This surplus is an inducement for new development.
  - Major issues for the Blackstone Valley include:
    1. Lack of an east-west connector highway between Rt. 146 and I-495
    2. Growing residential and commercial sprawl, including the promotion of low-density housing, resistance to affordable housing, and commercial zoning of local highways at the expense of town centers.
    3. Lack of coordinated preparation for future growth in the region. A coordinating council should be established to promote inter-local cooperation on growth issues.
    4. A major regional inventory and prioritization of natural resource areas for future acquisition should be conducted.

Water Quality Analysis of the Blackstone River Under Wet and Dry Conditions (2000, EPA)

- **Summary of Dry Weather Surveys**
  - Dry weather loadings from the headwaters are relatively small, with the exception of chromium and fecal coliform.
  - The major source of 5 trace metals is either UBWPAD, resuspended sediments, or both.
  - Woonsocket WWTF was the major source of ammonia. UBPWAD was the major source of phosphorus and nitrate. The major sources of TSS, chromium and lead were other sources.
  - High primary productivity in the River results in impaired water quality due to significant daily swings in dissolved oxygen, with the most impaired reached just above and below the MA/RI state line. This condition is a result of phosphorus inputs from wastewater treatment facilities on the River, with the major sources from UBWPAD and Woonsocket WWTF.

The Upper Blackstone Water Pollution Abatement District (UBWPAD) treatment plant

  - The 19 impoundments on the River are sediment traps, resulting in what may be the single largest oxygen sink in each respective reach.
  - The advanced wastewater treatment implemented at the UBWPAD in the mid-1980's has made a significant improvement in the DO concentrations in the River.
- **Summary of Wet Weather Surveys**
  - The location of Worcester in the Blackstone River's headwaters has a strong influence on the River's water quality and quantity after a storm.
  - UBWPAD's ability to provide nitrification is impeded under high storm flows. UBWPAD discharges significant levels of ammonia during high flows, often exceeding permit levels.
  - Toxicity was much more prevalent during wet weather conditions and was observed in 35 of 118 wet weather sampling points. Forty percent of all toxic endpoints occurred in the first two miles of the river in the greater Worcester area.
  - Wet weather loadings may dominate the river for days after the event. In general, the major nonpoint sources of wet weather pollutants appear to be runoff related (new materials), although sediment resuspension (old materials) was significant for several reaches.

Blackstone River Watershed Reconnaissance Investigation (1997, USACOE)

- The reconnaissance investigation found significant ecological problems in the Blackstone River Watershed, including: lost or degraded wetlands, instream, pond, and riparian habitat; loss of a historic anadramous fishery; degraded waterfowl habitat; degraded resident fisheries; contaminated sediments; and poor water quality.
- Two major issues must be addressed prior to proceeding with larger restoration projects: (1) the risk posed by contaminated sediments and (2) the issue of re-suspending sediments.

- The reconnaissance investigation identifies a variety of potential restoration projects with a total estimated cost of $18,400,000. Implementation of the plan would require full cooperation of local, state and federal agencies.

1998 ACOE Blackstone River Feasibility Study (for ACOE by Epsilon, 2003):

This study investigated **94 potential wetland restoration sites** in the central/southern portion of the Blackstone River Watershed and ranked them according to priority. 5 sites were ranked as a High Priority, 49 sites were ranked as Medium Priority and 40 sites were ranked as Low Priority. The High Priority sites are as follows:

- Burnt Swamp (Wrentham): vegetate bare soil to woody buffer
- Blackstone River (Northbridge/045): regrade, vegetate bare soil to woody buffer
- Emerson Brook (Uxbridge/097): re-route Brook, vegetate bare channelized area
- Tributary to Upper Burnt Swamp (Wrentham): flood to restore wetland and control invasives
- Bungay Creek (Bellingham/128): remove lawn, fill and restore to wetland

Headwaters Summit-Goals, Assessment and Action Plan (Blackstone Headwaters Coalition, 1996)

- **Vision and Goals for the Headwaters to the Blackstone River**
  - That the Blackstone Headwaters attain the highest possible water quality, including meeting fishable and swimmable standards.
  - To restore the streamways to a natural condition wherever feasible.
  - An educated public with regard to water resources in the Headwaters and throughout the Blackstone River Watershed.
  - Enhanced responsible public access to surface waters.
  - Awareness that the City of Worcester's economic health is tied to its environmental health.
  - Increased commitment on the part of governmental bodies to the protection of water and related environmental resources.
  - Enhanced responsible recreational opportunities.
  - Greenway corridors for wildlife, responsible recreation and aesthetics.
  - Let the natural beauty of the City of Worcester shine through by restoring its natural assets.

Blackstone River Valley Community Preservation Super Summit (June 2001, BRVNHC)

- **Summary of Super Summit PowerPoint Presentation on Regional Growth Issues**
  - By the late 1980's, roughly 30% of the region's 400,000 acres were developed. By 1999, 20,000 more acres had been developed (11,000 acres of low or medium density residential).
  - Land use at buildout will be dominated by 164,000 new acres of residential development, with an additional 20,000 acres zoned for commercial/industrial development.
  - The population of many Blackstone Valley towns will double or even triple at buildout. 1.7 million people will need housing based on the amount of jobs zoned.
  - The Blackstone Valley has zoned for an additional 211 square feet of commercial/industrial growth, equivalent to about 1,500 Wal-Marts.

- At an average of 1,737 residential building permits per year, maximum buildout of 85,000 new units will occur in approximately 48 years.
- Nearly 1,300 miles of new roads would be required at buildout.

Blackstone River Watershed Land Trust Alliance – Action Planning Document (undated)

- This document proposes creation of a Blackstone River Watershed Land Trust Alliance. The Alliance will be a loose umbrella organization that will meet quarterly to (1) facilitate the exchange of information, (2) prioritize and develop strategic, watershed-wide open space goals, and (3) work to make the Blackstone River Greenway a reality.
- There is a need for greater access to the Blackstone River for public recreation of all types. Steps should be taken to increase public awareness of "greenway and blueway" potential of the river valley.
- Develop a Strategic Open Space Plan using GIS to identify protected land and targeted parcels for open space conservation.

Blackstone River Fish Toxics Monitoring, 1993 (MA DEP-OWM, 1993)

During the summer of 1993, the MA-DEP analyzed edible fillets of fishes for selected metals, PCBs, and organochlorine pesticides as part of an interstate evaluation of the Blackstone River. The results of this survey indicated a problem with fish consumption in all waterbodies tested. Findings included:

- PCB concentrations in Blackstone River fish may come from a number of sources. Potential sources listed include historic wastewater discharges from industrial sources, the OMNI-DURALITE site just downstream from the Fisherville impoundment, and a historic industrial site in Farnumsville.
- Results from 1992 wet weather sampling indicate that there may be an increase in sediment PCBs between singing dam in Sutton and the Riverdale impoundment in Northbridge.
- In 1994, the MA-DPH issued advisories regarding PCB contamination in the Blackstone River. The advisories were for Riverdale Pond, Rice City Pond, and the Blackstone River Impoundment above the Blackstone Gorge.

Action Plan for the Miscoe Brook Watershed (Miscoe Brook Stream Team, 1997)

- **Long Range Action Plan Items**


Sediment laden runoff in Miscoe Brook (Grafton, MA)

  - Miscoe Stream Team: Continue to work together as a stream team, coordinating with community efforts to protect Miscoe Brook and encouraging formation of stream teams on other brooks in Grafton.
  - Advocacy for Miscoe Brook: Continue to protect Miscoe Brook through (1) active advocacy with state agencies, the Town, land trust and other groups, and (2) public education efforts.
  - Land Protection: Work in cooperation with the Town, landowners, the Grafton Land Trust to protect land in the watershed, including Great Meadows and the land of Dr. Robinson.
  - Trails: Work to create a trail on Flagg Brook.
  - Miscoe Brook Stewardship Teams: Encourage neighbors, scout groups, businesses, and other groups to provide stewardship of the Miscoe Brook system.

Blackstone River Watershed Information Sources

- 1998 Blackstone River Basin Water Quality Assessment Report (MA DEP)
- Draft Blackstone Watershed Action Plan, September 2001 (Rhode Island DEM)
- Blackstone River Feasibility Study, Task A, Volume 1 and 2, January 2003 (prepared for US ACOE)
- Water Quality Analysis of the Blackstone River Under Wet & Dry Weather Conditions, 2001 (US EPA)
- Blackstone River Watershed Action Plan-Rough First Draft, 1999 (MA EOEA)
- Blackstone River Watershed Action Plan – Final Draft, July 2001(MA DEP)
- Miscoe Brook Stream Team – Action Plan for the Miscoe Brook Watershed, March 1997
- Blackstone River Watershed Reconnaissance Investigation, 1997 (US ACOE)
- Blackstone River Watershed Investigation – Feasibility Study & Environmental Assessment – Draft Project Study Plan, December 1998 (US ACOE)
- Blackstone River Fish Toxics Monitoring, 1993 (MA DEP-OWM)
- A Sediment Control Plan for the Blackstone River, 1981 (MA DEQE)
- Information Resources for Integrated Watershed Management, Blackstone Watershed, 2002 (Clark Univ.)
- ACEC Nomination – Miscoe, Warren & Whitehall Watersheds, 1999 (submitted to EOEA)
- Town of Sutton Master Plan, 1992 (Sutton Planning Board)
- Blackstone Watershed Report Card – 1998 Designated Use Impairment (2002, MA-DEP)
- 1996 Headwaters Summit – Goals, Assessment & Action Plan, (Blackstone Headwaters Coalition)
- 2020 Growth Strategy for Central Massachusetts, February 2000 (CMRPC)
- UBWPAD Regional Wastewater Treatment Facilities Plan, May 2001 (CDM)
- Nonpoint Action Strategy-Blackstone River Basin (Final Version), July 2001 (MA DEP)
- Blackstone River Watershed Land Trust Alliance – Action Planning Document (undated)
- Draft Upper Blackstone River Watershed Wetlands Restoration Plan, February 2003 (MA EOEA)
- Sustainable Watershed Planning in Blackstone River Watershed, June 2001 (Timothy Randhir, UMass-Amherst)
- Blackstone River Watershed Super Summit Resource CD – Buildout Across Borders (various sources)

Website Links

- Blackstone River Watershed Association www.thebrwa.org
- Blackstone River Coalition http://www.nps.gov/blac/zap/home/home.html
- Blackstone Valley Institute http://www.nps.gov/blac/institute/index.html
- ACOE Blackstone Watershed Restoration Study http://www.nae.usace.army.mil/ (select "Projects" link)
- John H. Chafee Blackstone River Valley National Heritage Corridor Commission http://www.nps.gov/blac/home.htm
- The Blackstone River Bikeway www.blackstoneriverbikeway.com
- Blackstone River Watershed Council / Rhode Island Blackstone River Valley Tourism Council www.tourblackstone.com
- U.S. Geological Survey information on the Blackstone Watershed http://ma.water.usgs.gov/basins/blackstonesfw.htm
- Massachusetts Audubon Society-Broad Meadow Brook Wildlife Sanctuary http://www.massaudubon.org/Nature_Connection/Sanctuaries/Broad_Meadow/index.php
- Massachusetts Riverways Programs http://www.mass.gov/dfwele/river/riv_toc.htm
- Rhode Island Rivers Council http://www.planning.state.ri.us/rivers/default.htm
- American Heritage Rivers website: http://www.epa.gov/rivers

2.2 WATERSHED PLANNING MAPS

GeoSyntec produced several maps to assist the Watershed Advisory Committee in identifying the watershed planning priorities and action items discussed in Section 3. The maps were presented in draft format for review during the public planning forums. Each of the maps described below are included as Appendices to this report.

A. **Watershed Land Uses:** This map identifies land uses throughout the watershed, as obtained from MassGIS and Rhode Island GIS.

B. **Water Resources:** This map consists of water resources features readily available from MassGIS and Rhode Island GIS, including:

- Major river basin and sub-basin watershed boundaries
- Rivers and streams
- Lakes and ponds
- Wetlands
- Public water supplies and their Zone II wellhead protection areas
- Flood zones (100-year and Velocity Zone)
- Outstanding Resource Waters

Broad Meadow Brook Wildlife Sanctuary

C. **Wildlife Habitat / Ecological Resources:** This map consists of wildlife habitat and ecological resources features readily available from MassGIS, including:

- Certified and Potential Vernal Pools
- Wetlands
- Priority/Estimated Habitat for Rare Wildlife
- Areas of Critical Environmental Concern
- *BioMap* Core Habitat/Supporting Natural Landscapes
- *Living Waters* Core Habitat and Critical Supporting Watersheds
- Major basin and sub-basin watershed boundaries

American Brook Lamprey
Lampetra appendix

SECTION 3: THE WATERSHED ACTION PLAN

3.1 WATERSHED ACTION PLANNING CATEGORIES

At the project kickoff meeting on January 23, 2004, the WAC discussed the process of developing a Watershed Action Plan and debated the establishment of action planning priorities. The Committee reached consensus on working within the framework of the eight planning categories listed below. At the planning session held on August 12, 2004, the WAC voted to select the top three planning category priorities for the watershed. As indicated below, the WAC voted that the planning category of "Water Quality Improvement and Protection" was the highest priority for the watershed.

River Otter
Lutra canadensis

BLACKSTONE RIVER WATERSHED ACTION PLANNING CATEGORIES

Priority actions for the Blackstone River Watershed for:

- ☆ **Water Quality Improvement & Protection** (*voted #1 High Priority*)
- ☆ **Water Quantity/Streamflow Protection & Management** (*High Priority*)
- ☆ **Habitat Improvement & Protection** (*High Priority*)
- **Open Space Acquisition, Protection & Planning**
- **Recreational Use & Access**
- **Local Capacity Building**
- **Public Outreach & Education**
- **Sustainable Development**

3.2 WATERSHED ACTION PLAN

The Watershed Advisory Committee and public participants worked over the course of four public forums toward reaching consensus on priority goals and actions for the 5-year Action Plan. After reviewing summaries of previous watershed assessments prepared by GeoSyntec, discussion was organized around the eight planning categories listed above. The Committee initially worked to establish a regional consensus on broad goals and actions, and then worked toward the prioritized recommendations described on pages 15-32.

Within each of the eight planning categories listed above, the WAC voted to select the top three high priority action items. The high priority action items are identified throughout the Action Plan by the star symbols below. In several categories, the voting resulted in a tie between two action items for designation as the top priority.

☆1 #1 Priority Action Item for the Planning Category

☆ High Priority Action Item (top 3 for the Planning Category)

BLACKSTONE RIVER WATERSHED – FIVE YEAR ACTION PLAN

A. Water Quality Improvement and Protection

OBJECTIVE #1: Improve bacteria and toxicity monitoring throughout the watershed.

ACTION ITEMS

1. **Bacteria and Toxicity Monitoring Improvements**

- State and Blackstone River Coalition volunteer monitoring activities in the Blackstone watershed should place greater emphasis on assessing bacteria and toxicity issues.
- MA and RI agencies should implement bacterial and toxicity criteria for assessment of river impairment from current and historic sources.

Responsible Parties: MA-DEP, RI-DEM, non-profits

OBJECTIVE #2: Improve watershed planning through development of modeling tools.

ACTION ITEMS

1. **Develop a basin-wide (bi-state) water quality and water quantity model** for the Blackstone River watershed, for use as a watershed planning tool. The states must be active partners in agreeing on model parameters, responsibilities, etc.

- The model should be calibrated with public health indicators and data on existing impacts to water quality and quantity.
- Blackstone River Coalition volunteer monitoring data should be integrated into model development, calibration and future updating.

Responsible Parties: universities, state agencies, non-profits

OBJECTIVE #3: Construct/restore riverine wetlands designed for water quality improvement.

ACTION ITEMS

1. Focus **wetland construction and restoration** efforts on high priority areas such as:

- Wetland restoration sites listed as "high priority" in the 2003 Army Corps of Engineers- Blackstone River Feasibility Study.
- Construct a wetland adjacent to the Grafton municipal wastewater treatment plant, to improve water quality in the Blackstone River and provide wildlife habitat and environmental education.

Responsible Parties: MA-DEP, RI-DEM, ACOE, municipalities

OBJECTIVE #4: Promote watershed-wide application and enforcement of regulatory tools for water quality protection.

ACTION ITEMS

1. Each Blackstone Watershed municipality should establish a **strong erosion and sedimentation (E/S) control bylaw**. A model E/S control bylaw has already been developed by MA-DEP for municipalities to review, modify and adopt. Other model bylaws can be obtained from the online bylaw library of the Southeastern Regional Planning and Economic Development District (http://www.srpedd.org/bylaw.htm) or the Citizen Planner Training Collaborative (http://www.umass.edu/masscptc/examplebylaws.html). Model soil erosion ordinance guidance for RI and the RIDEM RIPDES Program can be found at www.planning.ri.gov.

   Responsible Parties: Municipalities, Regional Planning Agencies (RPAs)

2. The Massachusetts DEP and Rhode Island DEM should rigorously enforce **Stormwater Phase II permitting**. In Massachusetts, efforts should focus particularly on areas that drain to waterbodies on the Integrated List of Impaired Waters (the 2004 List can be found at http://www.mass.gov/dep/brp/wm/tmdls.htm. Information on Phase II permitting in Rhode Island is at: www.state.ri.us/dem/programs/benviron/water/permits/ripdes/stwater/index.htm

   Responsible Parties: MA-DEP, RI-DEM, municipalities

Native Brook Trout
(Salvelinus fontinalis)

3. **Cold Water Fishery Classification:** Upgrade the classification of stream reaches known by the MA Division of Fisheries & Wildlife to support cold water fisheries resources from "Class B" to Class B-Cold Water Fishery" in the next re-issuance of state water quality standards. Pursue a similar effort for Rhode Island.

   Responsible Parties: MA-DFW, MA-DEP, RI-DEM

OBJECTIVE #5: Repair leaking sewers, particularly in urban areas.

ACTION ITEMS

1. State DEPs (MA and RI) should prioritize use of federal (EPA) state revolving funds (SRFs) for municipal sewer improvements in urban areas.
2. Septic system modeling should be used to aide problem area assessment.

Responsible Parties: MA-DEP, RI-DEM

OBJECTIVE #6: Improve scale and coordination of water quality monitoring efforts.

ACTION ITEMS

1. Continue the MA-DEP **SMART Monitoring** program and provide technical support to Blackstone River Coalition volunteers. Extend the SMART Monitoring approach to Rhode Island.
2. MA-DEP and RI-DEM should **coordinate sampling and TMDL development** for the watershed according to the same time schedule.

Responsible Parties: MA-DEP, RI-DEM, non-profits

B. Water Quantity and Streamflow Protection

OBJECTIVE #1: Identify low-flow problems and set minimum flow standards for rivers and streams throughout the Blackstone River watershed.

ACTION ITEMS

1. **Develop a bi-state hydrogeologic simulation model.** The model should (1) assess "gaining" and "losing" reaches, (2) establish reliable instream flow projections, (3) incorporate water use and recharge projections, and (3) be developed in cooperation with the ongoing Rhode Island hydrogeologic study.

   Responsible Parties: Universities, MA-DEP, RI-DEM, EPA, USGS

Rolling Dam at Blackstone Gorge, Blackstone, MA

2. **Establish and regulate minimum flow standards** for high priority stream reaches, including:

   - Conduct a study of the **Blackstone Gorge** to estimate minimum flow standards to sustain fisheries.
   - Review and amend **Federal Energy Regulatory Commission (FERC) licenses** as necessary to require flow modulations from licensees to minimize river flow fluctuations.

   Responsible Parties: MA-DEP, RI-DEM, FERC

3. Collect and assess **sub-watershed flow data.** Monitoring by the state and NON-PROFITS volunteers should focus more attention on collecting baseline and ongoing flow data for smaller stream systems. Smaller streams are subject to significant fluctuations in flow in response to changes in land use, development and water use.

   Responsible Parties: MA-DEP, RI-DEM, non-profits

4. **Interbasin Transfers:**

   - Establish minimum flow standards (based on impact criteria) for use in permitting/approval of interbasin transfers and water withdrawals.
   - Establish mechanisms for increased public input to Interbasin Transfers.

   Responsible Parties: MA-EOEA, RI-DEM

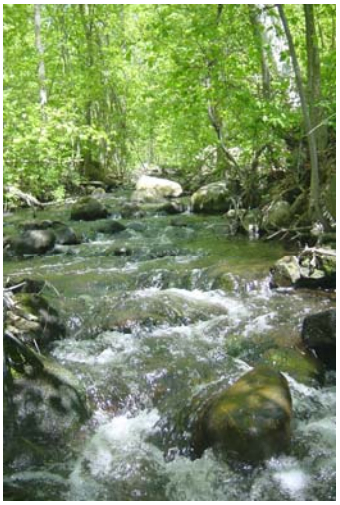
OBJECTIVE #2: Protect and restore natural hydrology throughout the watershed.

ACTION ITEMS

1. **Restore natural site hydrology at priority areas identified from Objective #1 through:**

   - Low Impact Development (LID) retrofit projects (recharge BMPs)
   - Urban tree planting
   - Promote private septic systems and alternative on-site wastewater treatment vs. sewer systems
   - Conduct a "stormwater demonstration project" where good base data exists

   Responsible Parties: Municipalities, MA-DEP, MA-DCR, RI-DEM,



2. **Construct riverine wetlands** to (1) decrease imperviousness, (2) increase infiltration, and (3) decrease/eliminate sewer inflow and infiltration (I/I).

   Responsible Parties: non-profits, municipalities, MA-DEP, RI-DEM

3. Remove/breach the **Wilkinsonville Dam** (Sutton) and **MassElectric Dam** (Millbury).

   Responsible Parties: MA-DEP, ACOE

4. Target **land acquisition for streamflow and ecosystem protection** through the EPA's and MA-DEP's Source Water Assessment Program (website at www.mass.gov/dep/brp/dws/swap.htm).

   Responsible Parties: EPA, MA-DEP, RI-DEM

C. Habitat Improvement and Protection

OBJECTIVE #1: Implement high priority wetland and aquatic habitat restoration projects.

ACTION ITEMS

1. Wetland Restoration:

- Implement high priority wetland restoration projects in Massachusetts recommended in the Blackstone River Feasibility Study (ACOE, 2003) and the Upper Blackstone River Watershed Wetlands Restoration Plan (MA EOEA, 2003). In Rhode Island, high priority restoration sites should be identified by a wetland restoration study (RI-DEM).
- Municipalities and non-profits in the watershed should partner with MA-DEP to pursue enforcement and mitigation for wetland filling, based on evidence from DEP aerial photo analysis. Town conservation commissions could work with DEP to review potential wetland violations and prioritize sites for further investigation and enforcement actions.

Responsible Parties: MA-EOEA agencies, RI-DEM

Eroding bank at Coal Mine Brook, near Lake Quinsigamond.

2. Stream Restoration:

Identify high priority degraded stream banks and fund their restoration. High priority projects include (1) streambank restoration at **Coal Mine Brook** (Worcester) and (2) the proposed project to daylight culverted sections of **Beaver Brook** (Worcester).

Responsible Parties: Municipalities, MA-DEP, RI-DEM

Fisherville Marsh, Grafton

3. Pond Restoration:

- Restore and remediate Rice City Pond (Uxbridge)
- Restore Fisherville Pond (Grafton)

Responsible Parties: MA-DEP, ACOE, EPA

4. Fish Passage:

- Implement fish passage projects on the four lowest dams on the Blackstone River in Rhode Island (ACOE).
- Conduct a study to identify high priority locations to construct fishways or remove dams and other barriers to fish passage in the Massachusetts portion of the watershed, including tributary locations (MA Riverways, River Restore, MA-DEP, American Rivers). Potential locations include the Wilkinsonville Dam and the MassElectric Dam.

Responsible Parties: MA-Riverways Programs, MA-DEP, RI-DEM, American Rivers, USFWS, URI, EPA, ACOE, dam owners, non-profits, Save the Bay, etc.

5. Vernal Pools:

Certify (MA) and identify (RI) vernal pools throughout the watershed. This effort should involve local conservation commissions in MA and RI, MassAudubon, the URI Heritage Inventory Program and the Blackstone River Valley National Heritage Corridor Commission.

Responsible Parties: Conservation Commissions, URI Heritage Inventory, MassAudubon, BRVNHC

OBJECTIVE #2: Use *BioMap* and *Living Waters* to guide protection and restoration of unique habitats.

ACTION ITEMS


Blackstone River at Route 16 in Uxbridge

1. Implement recommendations of the *BioMap* and *Living Waters* reports. Designate rare/endangered species habitat above and beyond "Estimated Habitat" boundaries, to include important supporting landscapes.

   Responsible Parties: MA-EOEA

2. Identify **regional linkages** between key green spaces and habitat areas. Use this information to guide habitat corridor protection.

   Responsible Parties: MA-EOEA, RI-DEM, NON-PROFITS

3. To guide planning efforts, the habitat information from *BioMap* and *Living Waters* should be presented as an overlay to maps depicting both protected and unprotected open spaces.

   Responsible Parties: NON-PROFITS, Regional Planning Agencies, municipalities


Blandings Turtle

4. Develop regulations which allow appropriate state and local regulatory agencies to implement broader rare species habitat protection, with mechanisms for both proactive (identify habitat and protect it) and reactive (allow development, but with precaution) protection.

   Responsible Parties: MA-EOEA, RI-DEM

OBJECTIVE #3: Raise awareness of cold water fisheries and increase their protection.

ACTION ITEMS

1. **Cold Water Fishery Classification**: Upgrade the water quality classification of stream reaches known by the MA Division of Fisheries & Wildlife to support cold water fisheries resources from "Class B" to Class B-Cold Water Fishery" in the next re-issuance of state water quality standards. Pursue a similar effort for Rhode Island.

   Responsible Parties: MA-DEP, MA-DFW, RI-DEM

2. Focus stream **cleanup and protection efforts** on the 25 cold-water fisheries within the Blackstone river watershed (Massachusetts Riverways Programs, BRWA and other volunteer organizations.

   Responsible Parties: MA-Riverways, RI-DEM, non-profits

D. Open Space Acquisition, Protection & Planning

OBJECTIVE #1: Protect and provide stewardship for high priority open space parcels.

ACTION ITEMS

1. **Acquire high priority open space parcels for recreation, including:**
   - Canoe access plan for Rt. 16: Mendon Street property just south of Stanley Woolen Mill would make good picnic area and paddler access point.
   - Lake Manchaug Greenway (to Douglas State Forest)
   - Blackstone Heritage State Park acquisition list
   - Trust for Public Land – Bikeway parcels to secure right of way (Millbury/Sutton/Grafton and Millville/Blackstone)
   - Worcester Visitor Center – trails and canoe access

   Responsible Parties: Land Trusts, MA-DCR, RI-DEM, Municipalities

Purgatory Chasm State Park
Sutton, MA

2. Promote and support **surface water recreation and open water habitat** (MA-DCR, RI-DEM, municipalities, Land Trusts). The following locations are a high priority for the watershed:
   - Wallum Lake (Douglas/Burrillville) – the boat ramp area offers a high priority opportunity for a greenway/trail connection.
   - Tri-Centennial Park (Sutton)
   - Branch River (Burrillville)
   - Stanley Woolen Mill (Uxbridge)
   - Fisherville Pond Flyway (Grafton)
   - Rice City Pond (Uxbridge) - dredge and repair dam.
   - Coes Pond (Worcester)–Dam repair (under MEPA review)
   - Leesville Pond – dam repair, EPA s.319 funds to rebuild dam for water quality/habitat.

   Responsible Parties: Land Trusts, MA-DCR, RI-DEM, Municipalities

Rice City Pond, Uxbridge,

3. Land trusts and other non-profits should develop partnerships with municipalities for **greenway/riverway protection**. In areas contiguous with state forests and parks, a priority should be placed on identifying and protecting parcels that the state (MA-DCR, RI-DEM) is not able to acquire.

   Responsible Parties: Land Trusts, Municipalities

4. Identify priority parcels, fund land acquisitions and improvements to **connect and sustain state parks** (River Bend, Purgatory Chasm, and Blackstone Gorge Bi-State Park).
   - Build a bridge at Rolling Dam (Bi-state Park)

   Responsible Parties: Land Trusts, MA-DCR, RI-DEM, Municipalities

5. Acquire/protect **priority greenway parcels**, including:
   - Fisherville Pond, northwards from east bank
   - Millbury branch rail line – get town owned land dedicated as greenway/open space

   Responsible Parties: Land Trusts, MA-DCR, RI-DEM, Municipalities

E. Recreational Use and Access

OBJECTIVE #1: Promote "Riverway" connections including greenways, bikeways, trails and habitat corridors.

ACTION ITEMS

1. **Implement the Blackstone River Bikeway**, to lead greenway development in the watershed. When completed, the Bikeway will extend 48 miles from Providence to Worcester. The Bikeway project will provide a mostly off-road alternative transportation route and will encourage additional trail and greenway connections in the communities along its route. This bi-state linear park will connect New England's second and third largest cities, serving a population of over 1 million.

Overview of Blackstone River Bikeway

   Other priority bikeway/trail projects include:

   - Development of a bikeway spur at Rice City Pond
   - Sagatabskot Ridge Trail (Quinsigamond Visitor Center)

   These bikeway projects should be lead by the Blackstone River Valley National Heritage Corridor (BRVNHC, National Park Service), in cooperation with MA and RI state agencies (MA-DCR, MA-DEP, MHD, RI-DOT, RI-DEM), municipalities and private parcel owners.

   Responsible Parties: BRVNHC, Land Trusts, State Agencies

2. **Identify a comprehensive listing and description of grant sources** for riverway/greenway protection and provide access to this information via the Blackstone River Coalition website.

   Responsible Party: BRWA

3. Continue to extend and improve trail continuity of the **Southern New England Trunkline Trail** (SNETT). This 20-mile-long, multiple-use, unpaved trail currently runs between the Franklin and Douglas State Forests. It connects to other trails in Connecticut and Rhode Island and is recognized as a National Recreational Trail. The Massachusetts portion of the trail is owned and maintained by the MA DCR. A highest priority action for this trail is to connect its western terminus with existing trails in East Thompson, CT.

   Responsible Parties: Land Trusts, MA-DCR, municipalities


Grafton-Upton Railroad, circa 1920's

4. Conduct necessary feasibility studies and promote development of a greenway corridor along the abandoned **Grafton-Upton rail line**.

   Responsible Parties: Land Trusts, MA-DCR, municipalities

OBJECTIVE #2: Promote recreational fishing opportunities.

ACTION ITEMS

Smallmouth Bass

1. Promote "catch and release" **fishing tournaments** at locations throughout the watershed. Potential collaborating groups should include the BRWA (and other members of the Campaign Coalition), Trout Unlimited, local rod and gun clubs, and the Massachusetts Division of Fisheries and Wildlife-Aquatic Resource Education Program.

2. Develop partnerships between the organizations listed above to sponsor **"learn how to fish" events**.

Responsible Parties: non-profits, MA-DFW, Trout Unlimited, local rod & gun clubs

OBJECTIVE #3: Improve Canoe Access

ACTION ITEMS

1. Implement recommendations for canoe access improvements from the Blackstone River Valley National Heritage Corridor (BRVNHC) River Access Plan. The River Access Plan includes recommendations for the four phases of improvements listed below:

Phase 1:
1. Route 16 / Uxbridge, MA (River Road/Uxbridge, MA)
2. Route 122 / Uxbridge, MA (Blackstone Gorge/Blackstone, MA)
3. Manville / Cumberland, RI
4. Sutton Street/Northbridge, MA (Riverdale Dam & Rice City Pond portages)

Phase 2:
5. Riverlin Street / Millbury, MA
6. Manville / Lincoln, RI
7.. Albion / Lincoln, RI
8. Lonsdale Industrial Park / Lonsdale, RI

Phase 3:
9. Route 146 A / North Smithfield, RI
10. Tupper Park/BVB&GC (Access around Rolling Dam)
11. Monument Square / Blackstone, MA

Phase 4:
12. McCracken Road / Millbury, MA
13. Quinsigamond Village / Worcester, MA
14. Millbury Street / Worcester, MA
15. Slater Mill / Pawtucket, RI

Responsible Parties: BRVNHC, Public Access Board, RI-DEM BRVNHC, municipalities

2. Develop the **Fisherville Portage** or a navigable sluiceway at the Fisherville Dam in Grafton, to enhance canoeing between the Quinsigamond River and the mainstem of the Blackstone River. This project should involve collaboration between the town of Grafton, the Blackstone Headwaters Coalition and the developer of the site.

Responsible Parties: Town of Grafton, Blackstone Headwaters Coalition, site developer

F. Sustainable Development

OBJECTIVE #1: Promote Sustainable Approaches to Residential Development

ACTION ITEMS

1. Support **Low Impact Development** (LID) and **Open Space Residential Development** approaches to site design. Planning bylaws and ordinances should be reviewed and modified as necessary to promote these environmentally sensitive approaches to site design and stormwater management. Pilot projects and demonstration projects using these techniques should be encouraged and promoted in each watershed community wherever possible.

   Responsible Parties: MA-EOEA, RI-DEM, municipalities

A Low Impact Development (LID) rain garden.

2. Promote and support passage of the **Massachusetts Land Use Reform Act** (MLURA), which would eliminate the option of "Approval Not Required" subdivision and land development. Information on this proposed legislation can be found at the website of the Massachusetts Chapter of the American Planning Association: http://www.massapa.org/legislation_lura_120602.htm

   Responsible Parties: MA-EOEA, municipalities, non-profits

3. Conduct an assessment of **wastewater capacity issues** for municipalities. This assessment should provide a watershed perspective, but be targeted to municipal planning efforts. The assessment should address the issues, feasibility, and costs of both centralized and decentralized wastewater management alternatives.

   Responsible Parties: MA-EOEA, RI-DEM, universities

4. Municipalities should place a greater emphasis on **sustainable water supply** as part of the approval process for new developments. Specific recommended steps include:

   - Implement recommendations of RI and MA water use/water supply deficit projections.
   - The Blackstone watershed area should be fully assessed by EOEA as part of the ongoing Water Assets Study.
   - Require proposed developments over a threshold size to conduct a water supply study. Availability of a sustainable water supply should a condition of site plan approval.
   - As part of the hydrogeologic model discussed under Section B of this Action Plan, assess basin-wide condition and water supply capacity of aquifers in the Blackstone River watershed.
   - Municipalities should develop action plans to improve water conservation and water-use efficiency.

   Responsible Parties: MA-EOEA, RI-DEM, municipalities, universities

OBJECTIVE #2: Facilitate the adaptive re-use of existing infrastructure.

ACTION ITEMS

1. **Brownfields and Mill Redevelopment:** To (1) minimize development pressure on the remaining open spaces in the Blackstone River watershed and (2) improve the social and economic value of previously developed land, underutilized and/or abandoned industrial sites such as mill facilities and brownfields should be prioritized for redevelopment. Two examples of high priority sites with re-development potential are described below.

Stillwater Mill
(photo by Niverio Carvalho)

High Priority Mill Re-development Sites:

- **Stillwater Mill (Burrillville, RI):** The Stillwater Mill Complex is dilapidated but has significant re-use potential. The mill, which is currently partially occupied, should be a redevelopment priority.

1999 fire at Fisherville Mill

- **Fisherville Mill (Grafton, MA):** Between 1882 and 1986, Fisherville Mill manufactured a variety of products, including textiles, machine parts, stamps and lawn furniture. In 1999 a fire destroyed both the 330,000 square foot mill facility and a treatment plant that had been treating groundwater contamination from petroleum and other chemicals released during manufacturing operations. The mill site is still contaminated with petroleum, chlorinated volatile organic compounds, asbestos and heavy metals. An ongoing cleanup operation will allow the site to be put back to productive use.

Stanley Woolen Mills

- **Stanley Woolen Mills (Uxbridge, MA):** Options for redevelopment of the Stanley Woolen Mills were discussed as part of the Uxbridge Charette hosted by Dodson Associates in October 2003.

Responsible Parties: MA-EOEA, RI-DEM

2. **Bike Paths for Alternative Transportation:** As previously described under Category D – Recreational Use/Access, the Blackstone River Bikeway will serve as an alternate mode of transportation for commuters as well as major recreational bicycle facility.

Responsible Parties: NPS, MA-DCR, RI-DEM, municipalities, Land Trusts

3. **Mill Housing Initiatives:** Mill housing (multi-family structures in mill villages) is important to both the history and character of the Blackstone Valley, and has an important ongoing role in providing housing within historic village centers. Steps should be taken to encourage investment in and preservation of maintaining mill housing, including:

Mill housing in Riverdale
(Northbridge, MA)

- Tax credits for property owners, specifically targeted to promote restoration and renovation.
- Zoning bylaws to encourage adaptive re-use of mill housing.
- Community Preservation Act funds dedicated to preservation of historic mill housing.
- Awards to property owners for outstanding mill housing renovation and restoration efforts.
- Public relations and outreach efforts through local newspapers and other media outlets (i.e. regular articles highlighting historic or restored mill village homes).
- Steps such as those listed above should be taken to promote investment in Worcester's triple decker houses and other housing structures that are characteristic to the Blackstone Valley.

Responsible Parties: non-profits, municipalities, local media, Community Preservation Act funds

OBJECTIVE #3: Promote Sustainable Agriculture in the Blackstone River Watershed

ACTION ITEMS

1. **Protect and Preserve High Priority Farmsteads in the Blackstone River Watershed:** Maintaining working farms in the Blackstone River watershed is important to preserving both community character and the quality of life within the region…not to mention an important local source of fresh produce and other foods.

As development pressures increase, it is important to maintain a prioritized list of farmsteads in the watershed that can guide efforts to protect (by acquisition or other means) these farms if they are either put up for sale or proposed for development. Many farmlands (and other types of open spaces) operate under time-limited conservation restrictions where uses are restricted under Chapter 61, 61A and 61B of the Massachusetts General Laws. Massachusetts law provides for a reduction in property tax assessments for land that is voluntarily maintained in active forestry (Chapter 61), productive agriculture or horticulture (Chapter 61A), or open space and recreational (Chapter 61B) uses. Communities should be mobilized with the information and funding mechanisms necessary to protect priority farmlands as they become available for sale or come out of Chapter 61A protection. Municipalities throughout the watershed should take advantage of the following programs to assist with these efforts:

- The **Blackstone River Conservation Alliance** has developed maps to aide in the analysis of Chapter 61 parcel prioritization.
- The **MA Community Preservation Act** provides funding sources which can be used to address three core community concerns:
  - Acquisition and preservation of open space
  - Creation and support of affordable housing
  - Acquisition and preservation of historic buildings and landscapes

  A minimum of 10% of the annual revenues of the fund must be used for each of the three core community concerns. The remaining 70% can be allocated for any combination of the allowed uses, or for land for recreational use.
- The **Rhode Island Agricultural Land Preservation Commission**, and the **RI-DEM Open Space Protection Program**.

Responsible Parties: Municipalities, Land Trusts, non-profits

2. **Promote Opportunities for Community-Supported Agriculture**:
Community supported agriculture (CSA) is an approach to agriculture that benefits local farms as well as the communities that they are a part of. CSA is a partnership between a farm and a supporters that provides a direct link between the production and consumption of food. Supporters cover a farm's yearly operating budget by purchasing a share of the season's harvest. In return for purchasing shares in the farm, the farm provides supporters with fresh produce throughout the growing season. CSA farms can also provide produce for restaurants, roadside stands or farmers' markets while building membership.

CSA connects local farmers with local consumers; develops a regional food supply and strong local economy; fosters a sense of community; encourage land stewardship; and develops a reliable local market for growers and producers with small to medium farms. Such programs are often organized through local land trusts and food co-ops, with support available from both state and federal sources. Community support for local farms can also be promoted through farmer's markets and other programs as described below.

Responsible Parties: Municipalities, MA-DFA

3. **Provide Incentives and Community Support for Farmer's Markets:** Municipalities should work cooperatively with agricultural organizations to promote regularly scheduled farmer's markets. Municipalities can, at a minimum, support such efforts by providing free space for the market.

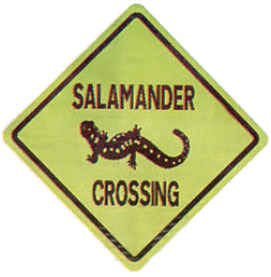
Responsible Parties: Municipalities, MDAR, RI-DEM (Division of Agriculture)

OBJECTIVE #4: Promote River Continuity Improvements and Reduce Fragmentation of "Green Infrastructure"

ACTION ITEMS

1. Conduct research necessary to identify, document and map important green infrastructure elements and river constrictions throughout the watershed. Investigations for this effort should include:

   - Identify/map important wildlife corridors (e.g. for amphibian breeding and migration, road crossings, obstacles to movement such as undersized and/or perched culverts, etc.)
   - Identify "road kill areas" where wildlife corridor improvements are needed.
   - Compare lists of ongoing/planned town DPW roadway projects with know constrictions to fish and wildlife movement. Where possible, work to incorporate habitat corridor improvements into the work plan.



This effort could be conducted with the Massachusetts Riverways Program as the lead agency, in collaboration with universities, Massachusetts Audubon Society, etc.

Responsible Parties: MA-Riverways Programs, universities, MassAudubon, non-profits

OBJECTIVE #5: Promote Continuing Community Ethic of Sustainable Development

The Blackstone River Watershed Advisory Committee feels strongly that concepts and techniques of sustainable development should be promoted as an ongoing community ethic that is not limited by the five-year planning framework of this Watershed Action Plan. Sustainable development should be incorporated into the planning for, and educational curriculum of, future generations. As such, future planning efforts (models, etc.) should incorporate time horizons that allow for sustainability analysis (scenarios for 25-years, 50-years, 100-years, etc.).

Responsible Parties: All watershed stakeholder organizations

Aerial view of the Massachusetts Audubon Society's Broad Meadow Brook Sanctuary (Worcester, MA)

G. LOCAL CAPACITY BUILDING

OBJECTIVE: Improve the capacity of local organizations and communities to act as ongoing stewards of the Blackstone River Watershed.

ACTION ITEMS

1. **Boost the organizational capacity of all environmental non-profits in the watershed, both individually and together as the Blackstone River Coalition.**

   - Develop regular press releases and news stories for local news papers and other media.
   - Play a central role in key watershed issues (e.g. 2003 UBPWD sewage release event) as primary contact for the press. Increase press interactions overall.
   - **Improve watershed organization websites.** Improve the Blackstone River Coalition's website (www.zaptheblackstone.org) by providing links to useful maps, and by becoming a portal for all other websites related to the Blackstone River watershed. .

   - **Co-sponsor events** throughout the watershed with other groups (e.g. canoe trips organized by the Appalachian Mountain Club), including civic groups, churches, etc.
   - Investigate the possibility of promoting sales of the **Blackstone Valley license plate** as a fundraising mechanism. In exchange for promoting sales of the plates, the BRWA could get a percentage of the sale proceeds to fund program activities. This concept would require a cooperative agreement with the Massachusetts Environmental Trust (MET) and the Registry of Motor Vehicles. A similar program could also be pursued for Rhode Island through the RI-DMV specialty license plates program.

   - As part of a municipal partnership, non-profit organizations could build partnerships with municipalities to assist with **public outreach tasks related to NPDES Phase 2** compliance (public meeting facilitation, etc.). A model for this kind of collaboration has been esatblished by the Housatonic Valley Association and the City of Pittsfield. BRWA/BRWC could also pursue contracts with municipalities to perform field services related to NPDES Phase 2, such as mapping of pipe discharges to 303(d)-listed water bodies and surface water supplies.

   Responsible Parties: non-profits, MET, MA-RMV, RI-DMV

2. **Pursue funding sources** with greater collaboration as a watershed community. Explore opportunities to jointly pursue grant/foundation funds, rather than compete for the same funds.

   Responsible Parties: non-profits, municipalities

3. **Continue regular meetings of the Watershed Advisory Committee** (WAC) that was convened to develop this Watershed Action Plan. The WAC should include state agency and municipal representatives from both Massachusetts and Rhode Island, educators, non-profit organizations, and other stakeholders.

   Responsible Parties: MA/RI state agencies, federal agencies, municipalities, non-profits, educators, etc.

4. An **annual watershed summit** should be conducted, including all of the parties listed above.

   Responsible Parties: MA/RI agencies, federal agencies, municipalities, non-profits, educators, etc.

5. Promote and support the **Worcester Urban Forestry Program**. This program should be a priority for increased activity through collaboration of the City and the MA Department of Conservation and Recreation.

   Responsible Parties: City of Worcester, MA-DCR

H. PUBLIC EDUCATION AND OUTREACH

OBJECTIVE: Increase public understanding and community stewardship of the ecological resources of the Blackstone River Watershed.

ACTION ITEMS

1. Create a **K-12 environmental education** pilot project (or series of projects) focused on raising awareness Blackstone River watershed ecology. Development of this curriculum could be done as a collaborative effort involving local universities, municipal schools, the Worcester Ecotarium, the Environmental Teachers Association, and the Blackstone Valley Tourism Council (BVTC). The BVTC has run a K-12 education program since 1993, using a 49-passenger river boat for environmental education with area students, and has a River Curriculum focusing on the Blackstone River.

   Responsible Parties: local schools and universities, Worcester Ecotarium, Environmental Teachers Association

2. **Storm Drain Decals** should be applied to every storm drain in the watershed over the next five years. Decals last for about ten years, eliminating the repeated painting associated with stenciling. Funding sources include the MA Environmental Trust, private foundations, and state and federal grants (e.g. s.319 Nonpoint Source (NPS) Program and CZM Coastal NPS Grants). Storm drain stenciling can be conducted through municipalities, and the Blackstone River Coalition.

   Responsible Parties: municipalities, non-profits, MET, MA-DEP and RI-DEM (s.319 funds)

3. **Poster-sized watershed maps** should be developed and displayed in all schools, town halls and public libraries in the watershed. The maps should show location within the watershed ("*you are here*"), as well as subwatershed boundaries and descriptions.

   Responsible Parties: BRWA, universities

4. Develop and implement the **Cold Water Awareness Campaign** (CWAC). A proposal for a pilot scale version of this project (for Cold Spring Brook in Sutton) has been submitted by Massachusetts Riverways Programs to the National Heritage Program.

   Responsible Parties: MA-Riverways Programs

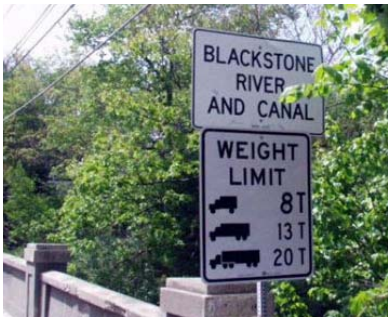
5. **Improve individual organization websites.** Improve the Blackstone River Coalition's website (www.zaptheblackstone.org) by providing links to useful maps, and by becoming a portal for other websites related to the Blackstone River watershed.

   Responsible Parties: non-profits

6. **Stream and River Crossing Signage:** Over the next five years, signs should be installed at stream and river crossings throughout the watershed, with a priority on the following locations:

   - All 25 cold-water streams;
   - All Blackstone River crossings along Route 146

   Responsible Parties: non-profits, MA-Riverways Programs



River signage at bridge crossing
Uxbridge, MA

7. The Blackstone River Coalition should develop regular **press releases and news stories** for local media including timely updates and the report card of results of the Blackstone River Coalition Volunteer Water Quality Monitoring program.

   Responsible Parties: non-profits

8. Create a **biography/video of the Blackstone River** watershed and its ecology. This effort could involve interviews with local scientists, academics, and naturalists.

   Responsible Parties: BRWA, universities

9. Promote K-12 hands-on **"lake education workshops"**, possibly as a partnership between the MA Congress of Lake and Pond Associations (COLAP) and the BRWA. These workshops could be similar to programs previously organized at Lake Quinsigamond by Mass Audubon.

   Responsible Parties: BRWA, MA-COLAP

10. The BRWA, in coordination with Clark University, should write a proposal for a Blackstone watershed **"GeoVentures" summer camps project**. This project would coordinate high school students through the Massachusetts Community Water Watch program.

    Responsible Parties: BRWA, Clark University

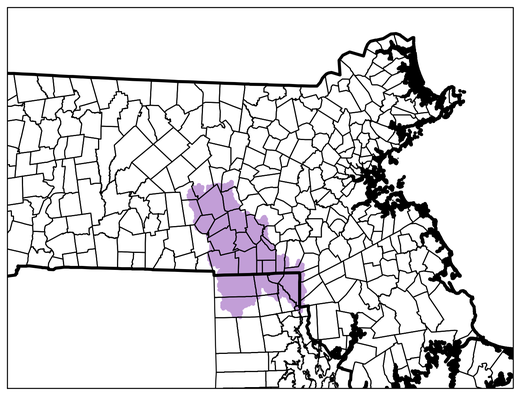
11. Create and disseminate a **watershed-wide outreach program** to reduce nonpoint source pollution and stormwater volume. Provide ongoing funds for implementation, printing, etc.

    Responsible Parties: Blackstone River Coalition

APPENDIX 1:

Watershed Land Use Map

Blackstone River Watershed Land Use



GIS Data Provided by MassGIS and RIGIS

Legend

- Transportation
- Industrial
- Commercial
- High Density Residential
- Low Density Residential
- Agriculture
- Open Land
- Other
- Water
- Blackstone River Watershed
- Surface Water
- Town Boundaries

0 5,000 10,000 Feet

N W E S

MASSACHUSETTS

RHODE ISLAND

CONNECTICUT

RUTLAND
WEST BOYLSTON
BOYLSTON
BERLIN
MARLBOROUGH
SUDBURY
WAYLAND
HOLDEN
PAXTON
NORTHBOROUGH
SOUTHBOROUGH
FRAMINGHAM
NATICK
SHREWSBURY
WORCESTER
WESTBOROUGH
ASHLAND
LEICESTER
SPENCER
HOPKINTON
SHERBORN
GRAFTON
MEDFIELD
AUBURN
MILLBURY
HOLLISTON
UPTON
MILLIS
CHARLTON
OXFORD
SUTTON
UXBRIDGE
HOPEDALE
MILFORD
MEDWAY
NORFOLK
MENDON
FRANKLIN
BELLINGHAM
DUDLEY
WEBSTER
NORTHBRIDGE
MILLVILLE
BLACKSTONE
WRENTHAM
PLAINVILLE
DOUGLAS
NORTH SMITHFIELD
NORTH ATTLEBOROUGH
LINCOLN
ATTLEBORO
SMITHFIELD
GLOCESTER
CENTRAL FALLS
PAWTUCKET
NORTH PROVIDENCE
JOHNSTON
PROVIDENCE
EAST PROVIDENCE
FOSTER
SCITUATE
CRANSTON
WARWICK

GeoSyntec Consultants

BOXBORO, MASSACHUSETTS

DATE: 02/10/04	SCALE: 1 inch equals 5,000 feet
PROJECT NO. BW0027	FIGURE NO. 02
DOCUMENT NO.	Blackstone_LandUse.mxd

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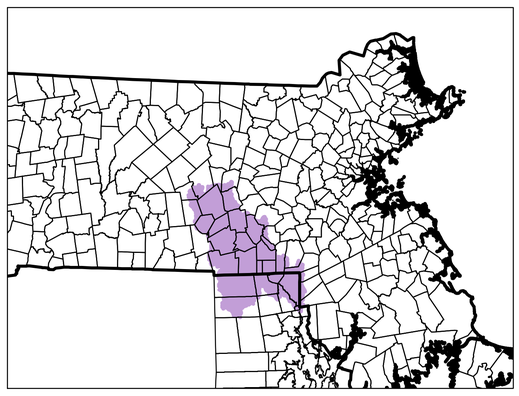
APPENDIX 2:

Water Resources Map

Blackstone River Watershed Water Resources



GIS Data Provided by MassGIS and RIGIS

Legend

- Public Water Supplies (MA only)
- Blackstone River Watershed
- Blackstone Subbasins
- Wetlands
- Surface Water
- Zone A - Areas subject to 100 year flood
- DEP Approved Zone II (RI)
- Outstanding Resource Waters Subbasin

0 5,000 10,000 Feet

N W E S

GeoSyntec Consultants

BOXBORO, MASSACHUSETTS

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DOCUMENT NO.			blackstone_water.mxd

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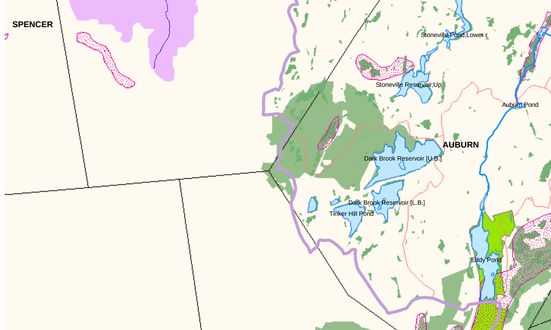
APPENDIX 3:

Wildlife Habitat Map

Blackstone River Watershed Wildlife Habitat



GIS Data Provided by MassGIS and RIGIS

Legend

- Certified Vernal Pools
- Blackstone River Watershed
- Wetlands
- Living Waters Core Habitat
- Living Water Critical Supporting Watersheds
- Priority Habitat
- Blackstone Subbasins
- BioMap Core Habitat
- BioMap Supporting Natural Landscapes
- Surface Water

0 5,000 10,000 Feet

N W E S

GeoSyntec Consultants
BOXBORO, MASSACHUSETTS

DATE:	06/14/04	1 inch equals 5,000 feet	
PROJECT NO.	BW0027	FIGURE NO.	01
DOCUMENT NO.		blackstone_habitat.mxd	

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APPENDIX 4:

Watershed Advisory Committee Contact List

APPENDIX 4:
BLACKSTONE WATERSHED ADVISORY COMMITTEE – CONTACT LIST

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  David J. Newton, RPM, OSRR, NH/RI SF Section,1 Congress Street, Suite 1100 (HBO),Boston, MA 02114-2023, 617-918-1243, newton.dave@epamail.epa.gov

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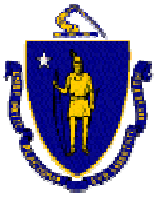
  Amy Mosher, Clark University, Worcester Small Schools, amoincr@yahoo.com



Mitt Romney
Governor

Kerry Healey
Lt. Governor

Ellen Roy Herzfelder
Secretary

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